CHAPTER II

THEORETICAL VIEWPOINTS ABOUT PREDICTORS
Theoretical views and operational definitions of predictors and criterion variable under consideration are presented in this chapter briefly so as to get the conceptual understanding of these variables as also to understand the rationale of the relationship of these variables with the achievement of the students in science specially in Biology.

2.1 Academic Achievement:

Despite many varied statements about the aims of education, the academic achievement of a pupil continues to be the primary concern and the most important goal of education and the main area of educational research. Stephens (1960) states, "Not that other aspects of educational objectives are to be ignored but the fact remains that academic achievement is the unique responsibility of all educational institutions established by the society to promote a wholesome scholastic development of the pupil."

According to Crow and Crow (1956) "Achievement means the extent to which a learner is profiting from instruction in a given area of learning." In other words, achievement is reflected by the extent to which skill or knowledge has been acquired by a person from the training imparted to
him; it is the outcome of general and specific learning experience. Therefore, the special acknowledgement of a person's skill the range and depth of his knowledge or his proficiency in a designated area of learning or behaviour is indicative of the extent of his achievement.

More often academic achievement refers to degree or level of success or proficiency attained in some specific area concerning school or academic work. In view of Good (1959), Biswas and Aggarwal (1971) there seems to be considerable similarities in as much as all of them place emphasis on knowledge attained or skills developed in the academic subjects usually designated by test scores.

Pressey, Robinson and Horrock (1959) define achievement as, "the status or level of person's learning and his ability to apply what he has learned." According to them, achievement would not only include acquisition of knowledge and skills but also attitudes and values as aspects of achievement. Achievement as manifested by the application of acquired skills and knowledge is a product of learning attitudes and interests since these factors would implicitly influence the extent of achievement. According to Travers (1964) the term refer to any desirable learning that occurs. It is obvious that whether a particular learning is referred to as an achievement or not, depends upon whether some body considers it desirable or not. Hence any behaviour that is learned may come within a definition of achievement.
Educational growth is considered as the main goal of education, which includes academic achievement. Therefore, academic achievement refers to the pupils knowledge attainment and skills developed in the school subjects which are assessed by the authorities with the help of achievement tests in the form of university examination. It is considered as primary goal of education. Traw (1960) defines academic achievement as "the attained ability or degree of competence in school tasks usually measured by standardized tests and expressed in age or grade units based on norms derived from a wide sampling of pupil's performance." In other words, academic achievement of a pupil is the knowledge attained and skills developed by him in the subjects in which he is imparted training at school. Academic achievement is the proficiency of the students as aforesaid in the academic subjects such as reading, writing, arithmetic, history, science etc. as well as the skills developed there in such areas as industrial arts and physical education. It is the competence actually shown by the students in the subject in which they have received instruction at school.

Good (1973) defines academic achievement as "knowledge attained or skill developed in the school subjects, usually designated by the test scores or by marks assigned by the teacher or both."

The need for measuring academic achievement is based on two fundamental assumptions of psychology. First, there
are differences within the individual from time to time known as behaviour oscillation i.e. academic achievement of the same individual differs from time to time, from one class to another and from one educational level to another. Secondly, there are individual differences. Individuals of the same age group, of same grade, usually differ in their potential abilities and academic proficiency whether these are measured by standardized measure of achievement or by teachers grading or by marks obtained in tests and examinations.

It is strongly argued that ranking of students, whether in marks or grades or in some other index, is necessary for effective teaching and learning for classification, guidance and direction of efforts and measurement of educational performance. Madson (1930) points out that marks and set goals motivate the students. Symonds (1927) listed incitement to study, promotion of competition, determination of promotion, assistance in educational and vocational guidance, awarding of credits and honours among the purposes of marks. Therefore, educationists and psychologists have been intensively interested for the last six decades in studying the complex determinants of academic achievement.

In the present study, achievement of the students in Biology was measured with the help of Achievement Test in Biology prepared by the investigator herself for the students of +1 stage.
2.2 Intelligence:

There is no agreement as regards the exact definition and nature of intelligence. It is said that intelligence is the capacity for rotational constructive thinking directed to the attainment of some end. In intelligent study of literature, in intelligent running of a house, in intelligent business organisation - in all forms of activities, capacity for relational constructive thinking is involved which is directed to the attainment of some end. These can be divided into following groups.

(I) **Ability to Adapt or Adjust** - one group of definitions emphasises that intelligence is the ability to adapt or adjust to new situations. McDougall (1912) and Stern (1914) belong to this group. But this definition put certain difficulties. For example, Stern (1914), the developer of the concept of IQ, has given the definition of intelligence as "general adaptability to the new problems and conditions of life." There are some people whom it is generally agreed that they are not very intelligent and who do not score very well on intelligence tests, yet they adapt very well to their environment. Other people, who score very well on intelligence tests and who are generally agreed to be quite gifted, make a very poor adjustment to their environment. Certainly what is a successful adjustment for one individual would be a poor adjustment for some one else, since people from different culture have different goals, talents and aspirations.
(II) Ability to learn - According to another group of psychologists, intelligence is the ability to learn. The more readily one is able to learn, the more intelligent he is. Name of Colvin (1974) can be mentioned here. But this definition also involves the limitations of perceiving it as a unitary phenomenon. There are many different kinds of learning and individuals who do well on some kinds of learning do not necessarily do well on others. Guilford (1967) in his research determines the rate of learning in several different kinds of learning tasks for a number of subjects. If there is such a thing as general learning ability, then those subjects who do the best on some learning tasks ought to do well on other also, but this was not the case. Statistically, correlations between learning rates for various tasks were quite small and some time insignificant. Zeaman and House (1966) while reviewing the research on the relationship between learning and intelligence (as measured by performance on standard intelligence tests), concluded that as long as learning task is simple enough, subjects of low intelligence are not proper learners than subjects of higher intelligence, although the results are far from clear.

(III) Ability to Carry on Abstract Thinking - According to third group, intelligence is the ability to carry on abstract thinking. Binet (1916) Terman (1921) and Freeman (1942) represent these views. Research on the relationship between learning and intelligence shows little relationship between simple learning and I.Q., but when the material
to be learned is complex or abstract, high IQ subjects perform better than low I.Q. subjects. As compared to this view which limits intelligence to one mental ability rather than attempting to encompass all mental functioning, Jensen (1969) has proposed two kinds of intelligence, level I and level II. Level I refers to basic associative abilities and would be best measured by a test such as digit span (e.g., remembering a phone number) while level II refers to abstract problem solving and thus corresponds closely to the capacity for abstract thinking.

Wechsler's (1944) definition seems to combine and extend the above three groups of definitions. He says, "Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment."

Stoddard (1943) presents a comprehensive description. According to him, "Intelligence is the ability to undertake activities that are characterized by (i) difficulty (ii) complexity (iii) abstraction, (iv) economy (V) adaptiveness to a goal (vi) social value, and (vii) the emergence of originals, and to maintain such activities under conditions that demand a consideration of energy and resistance to emotional forces."

But the main difficulty with Stoddard (1943) and Wechsler (1944) definitions is that many of the terms used are so vague that would be extremely difficult to demonstrate
that any given intelligence test is actually measuring "the global capacity to act purposefully, to think rationally and to deal effectively with the environment.

With regards to the theoretical viewpoints of intelligence, the Binet-Simon test of intelligence, which was finally developed in 1904, was a composite of many kinds of test items and seemed to measure broad aspects of mental functioning. Binet viewed intelligence as a composite of complex and varied mental functions, the average performance on which indicate the person's level of mental ability.

(I) Unitary Theory or Monarchic Theory - According to unitary theory which was put by Stern (1914), intelligence is single unit or capacity to solve all types of problems. According to this theory a man who is intelligent in doing one task will also be intelligent in doing other tasks because intelligence is the all round capacity of the individual. For example, Newton was great scientist. According to this theory he could be a great poet if he wished. But this is not true.

(II) Multifactor Theory - Multifactor Theory of intelligence was developed by Thorndike (1962), an American psychologist. Intelligence to him is nothing more than a convenient name for an almost infinite number of actual or potential specific connections between the stimuli and responses. Differences of intelligence among people are due to the number of connections in the neurological system. According to this
theory, there is no general intelligence. Thorndike's theory is atomistic theory of intelligence. He distinguished four attributes of intelligence i.e. level, range, area and speed.

(III) Eclectic Theory or two Factor Theory - Spearman (1904) observed that intelligence consists of two factors - one is 'g' factor and the other is 's' factor. The 'g' factor stands for the general ability and the 's' factor stands for the specific ability. Every individual has one 'g' factor and some 's' factors (or specific abilities). The 'g' factor is always the same for the same individual and the 'g' factor varies from task to task. Different individuals differ both in their 'g' as well as 's' factors. For doing any activity, 'g' factor is always involved and some of the 's' factors are also involved. Individual differences in intelligence are due primarily to individual difference in 'g'.

(IV) Group Factor Theory-

According to Group Factor theory intellectual abilities belong to certain groups which are not related to each other. But there is close relationship between the abilities belonging to the same group i.e. they have got positive correlation. So according to this theory a child who is intelligent in one group of knowledge may not be intelligent in the other group. But he may be equally intelligent in the various subjects of that very particular group.

According to Group factor Structure of intelligence,
intelligence neither consists two factors as proposed by Spearman nor multifactor as developed by Thorndike. The six primary factors emerged are as follows:

(a) Number Factor (N) - Ability to numerical calculations rapidly and accurately.

(b) Verbal Factor (V) - Found in tests involving verbal comprehension.

(c) Space relations (S) - Involved in any task in which the subject manipulates an object imaginary in space.

(d) Memory (M) - Involving the abilities to memorize quickly.

(e) Reasoning (R) - Found in tasks that require the subject to discover a rule of principle.

(f) Word Fluency (W) - Involved whenever the subject is asked to think of isolated words at a rapid rate.

(V) Five-level Hierarchical model -

Burt (1949) separated statistically four factors of intellect, namely (i) general factors common to all traits (ii) group factors common to some of the traits (iii) specific factors, limited to each trait whenever it is measured. (iv) Error factors, limited to each trait on each particular occasion whenever it is measured. He
proposed a five-level hierarchical model involving the hierarchical levels at (i) Human mind (ii) Relational level or general factor (iii) Associations (iv) Perceptions (v) Sensations.

(VI) Factor-Analytic Theory

Vernon (1950) developed another factor analytic theory of the organisation of intelligence which he called as hierarchy group factor theory. Vernon theory suggests that intelligence test measure an overall factor 'G' as well as two main types of mental abilities. The major group factors are (1) Ved: verbal, educational and numerical (2) KM: Practical, mechanical, spatial and physical. These two major factors can be divided into minor group factors such as mechanical, manual and ultimately these minor group factors can be further divided into various specific factors.

(VII) Structure of Intellect (SOI) By Guilford.

Guilford (1957) suggests that mind is composed of at least three dimensions of intellectual abilities namely operations, contents and products. He states that each dimension of intellect is sufficiently distinct which may be detected by factor analysis. Every intellectual ability, in the structure, is characterized in terms of the type of operation, the content and sort of product which results. However, three dimensions of intellect can be classified because of similarities among themselves. Five major groups of operational dimensions of intellectual abilities are (i) cognition (2) memory (3) divergent thinking (4) convergent
thinking, and (5) evaluation. The content may be (1) Figural (2) Symbolic (3) Semantic (4) Behavioural. The six types of products are (1) units (2) classes (3) relations (4) systems (5) transformations and (6) implications on the basis of factor analysis. Hence there are $5 \times 4 \times 6 = 120$ cells. The three kinds of classifications of the factors can be represented by means of a single solid model which is called the structure of intellect model. The view of Guilford is the most comprehensive view of intellect which has been presented so far. He takes into consideration all possible aspects of intellectual activity. This is the only theory which considers creativity (Divergent production or thinking) along with intelligence (convergent production or thinking) in the same model.

Thus, different models of structure of abilities based upon factor analysis have been suggested by different researches. In Gustafsson's (1984) view, one line of demarcation goes between models which postulates a general factor of intelligence - (e.g. Spearman (1904), Vernon (1950) and models which do not allow a general intellectual factor (e.g. Thurstone 1938, Cattell 1971): and another line of demarcation goes between hierarchical models (Burt 1949) and models which treat all the dimensions as being of equal generality.

Although there are various theories of intelligence but none of them is a complete one. Therefore, debate as to what intelligence is continues.
Although there have been studies showing the relationship of intelligence and achievement in different subjects, but there is need to explore the relationship of achievement in biology with the variable of intelligence at the senior secondary stage.

For the purpose of present study, intelligence has been operationally defined as "the ability to deal with numbers, analogies, opposites and synonyms, to make categories, to draw inference. Its measurement (verbal) is the total score on Tandon's Group Test of General Mental Ability."

2.3 Socio-Economic-Status:

As regard the term "Socio-Economic-Status" the dictionary gives the meaning as state, condition or standing of a person. Green, (1965) the sociologist, defines it, "a position in a social group or grouping in relation to other positions held by other individuals in the group or grouping." Thus, socio-economic status refers to social and economic standing. A person who has high standing in the community and has good income and who lives in a well furnished house and has ample opportunities is said to have good socio-economic status.

Good (1973) defines socio-economic status as "economic rank or position of the individual in the group to which he belongs. An individual's socio-economic status is his
group standing or ranking in terms of his social and financial position in relation to others." Individual may be born to it or he may have acquired it. But in the present study the subjects are just adolescent, so at this stage the socio-economic status of one's parents exercises a decisive influence on one's fortunes in life. Also one's economic condition tends to determine largely by one's social status, though of course, it is a fact that social status, is also determined by some other factors i.e. education, birth and social inheritance. But it is very difficult to separate social status from economic status. For all practical purposes they represent a single but complex reality in almost all advanced societies of the world.

Thus social status is the social standing or prestige of a person in his group or of the group in the community; the position that a person or group holds in public esteem. Status may be vague in some respects but fairly defined in others, depending on the social or other norms. Economic status may be determined by the size or the source of one's income. Economic status alone may not ensure social prestige. This may rest partly on wealth but may also be determined by race, nationality, religion, family or other factors.

In the present study, socio-economic status of the students is the measure of scores obtained on Socio-Economic Status Scale by Trivedi and Udai Pareek.
2.4 **Sex Differences:**

Difference are found in men and women. Women are more delicate while men are more sturdy. But in many areas, hardly any differences are found in their learning abilities. Investigations dealing with differences on account of sex have not yet shown such results which can be called fully scientific, hence it is very difficult to say anything definite regarding this point. It has also been noticed that on different portions of an I.Q. test there is a difference between the scores obtained by boys and girls. For example, on the part of dealing with linguistic ability, the girls score higher than boys and on the mathematical part boys score better.

2.5 **Personality:**

Tremendous research has been done on the topic but no final conclusions have been drawn as regards the nature of personality. The main obstacle to define the concept of personality is the lack of agreement about a definition of personality.

Some sociologists define personality in term of its social stimulus value. How an individual affects other persons with whom he comes in contact, whether he is impressive or repulsive, whether he has dominating or submissive personality. Personality, from this point of
view, becomes identical to reputation and impression mostly in terms of physical appearance, clothing and conversation.

Sociologists define personality in terms of social stimulus value. They put forward the individual in the background of society. According to them, individual is a reflection of the society. Personality is the subjective side of culture. In other words personality is the integration of all traits which determine the role and status of the person in society. Personality might, therefore, be considered as social effectiveness.

According to philosophical view personality is ideal of perfection. It is self-realisation.

According to the bio-physical view personality is what a man is within the individual. So personality is what actually is within the individual.

Freud (1957) is of the view that there are three major constituents of personality.

(a) Id - Id immoral, illogical and unconscious. It is the sum total of natural and general tendencies that cannot be satisfied in the society.

(b) Ego - Ego is social self. It is the sum total of consciousness, will power, intelligence and reasoning. It has relationship with id as well as super ego.

(c) Super Ego - It is known as moral self. It is the
higher and ideal part of the personality. Its function is to warn the ego about its defects and wrong actions.

He further says that if there is balance between id and super ego there will be balanced personality and if there is no proper balance between id and super ego there will be maladjusted personality.

Murray's (1938) views on the structure of the personality were heavily influenced by psychoanalytical theory. The concept that is most closely associated with Murray's name is "need" and in most of his practical experimental work, he focussed his attention on this concept. Adorno et al. (1950) too describing personality in terms of need say, "The forces of personality are primarily needs which vary from individual to another individual in their quality, their intensity, their modes of gratification and the objects of their attachment and which interact with other needs in harmonious or conflicting pattern." There are primitive emotional needs, needs to avoid punishment and to have social approval, needs to maintain harmony and integration within the self.

According to psychological view, personality is the sum total of physical, mental, emotional, social and temperamental make up of the individual. It is the essence of one's instincts, feelings, emotions, sentiments, thoughts, ideals, attitudes, aptitudes, interests, intelligence,
experience, habits, perception, memory, imagination and various ways of behaviour. His clothes, digestion or lameness, style of life, enthusiasm and the like colour his personality.

Allport (1961) attempted to define personality as "the dynamic organization within the individual of those psycho-physical systems that determine his unique adjustment to his environment." The definition given by Allport is very comprehensive and includes all aspects of an individual's personality. The word dynamic in his definition means that personality is undergoing a constant change but is still organised. It constitutes two types of systems psycho (mental) and physical and these two systems interact with internal and external environment. The word 'determine' lays emphasis on the psychophysical system that activates the organism for action. The unique adjustment of the individual to his environment means that each individual employs different methods of adjustment resulting in unique adjustment. Likewise Guilford (1959) defines personality "an individual's personality is his unique pattern of traits.....A trait is any distinguishable, relatively enduring way in which one individual differs from another.

In the words of Cattell (1956) who equates personality with the individual aspects of behaviour, "Personality is that which permits a prediction of what a person will do in a given situation.....Personality is concerned with all the behaviour of the individual, both overt and under
Eysenck (1960) defines personality as "more or less stable and enduring organization of a person's character, temperament, intellect and physique which determines his unique adjustment to the environment." He distinguished four sectors of personality: (1) cognitive sector (intelligence) (2) conative sector (character) (3) an effective sector (temperament) and (4) Somatic sector (constitution).

Therefore, while summing the above definitions it can be said that (i) Personality is unique to the individual and is only through the study of personality that the relevant difference among individuals can be made clear; (ii) it is the product of its own functioning. What we do today depends upon our experiences accumulated day after day which shape our personality by continuous interaction with the environment; (iii) it is the integrated unity of all aspects of a person's being physical, mental and social and (iv) it has a social relevance, the impact an individual has on others. Many psychologists equate personality with the hierarchy of social attitudes which an individual has.

In spite of the fact that educationists, psychologists and the researchers have from time to time asserted the relationship of personality traits and achievement in different
subjects, there has been probably no study in the area of achievement in the subject of Biology and that too specially at the senior secondary stage. Compared with the volume of research done in the general field of achievement the research into the field of achievement in Biology have been very little done upto secondary level and thus it appears logical that the nature of relationship of personality traits with the performance of the students in Biology at the Senior Secondary Stage may be explored with great vigour. Although equivocality can not be solved by taking one more study. However, it necessitates to probing into this area still further so as to accumulate greater evidence in support of one or the other side of the relationship between achievement and personality, and this paving the way to crystallization of findings.

For the purpose of present study, personality has been taken as defined by Cattell and Eber (1967) that is, which permits a prediction of what a person will do in a given situation and is concerned with all the behaviour of the individual, both overt and under the skin, and scores obtained on Cattell and Eber (1967) 16 Personality Factors Questionnaire (From A) are measure of personality.

2.6 Creativity

The tendency to emphasize interests by a wider area of disciplines to investigate the creative process and
the complex nature of the creative experience are the two reasons for not accepting any definition of creativity universally (Hallman, 1963). The first view of the tendency to assign different meanings to creativity has been reported by Vinacke (1960), Ghiselin (1963), and Yamamoto (1964). The second view, regarding the complexity of creative experience, is manifested by numerous definitions which Rhodes (1961) condensed into four roughly discriminating categories: person, process, press and product. Kneller (1965) observed that (a) creativity through the approach of person may be considered in terms of physiology, temperament, personal attitudes, habits and values of the person who creates, (b) process involves motivation, perception, learning, thinking and communication in which the act of creativity calls into play (c) press implies understanding of creativity by focussing attention on environmental and cultural influences, and (d) products of creativity include elements such as theories, inventions, paintings, carvings, poems and the like.

Personalological approach considers creativity as related to unique cognitive factors (Guilford, 1959; De Hann and Havighurst, 1961), and also dependent upon certain non-cognitive factors (Barron, 1955; Hammer, 1961; Getzels and Jackson, 1962; Mackinnon 1962; Taylor and Holland, 1962; Cropley 1966; Raina, 1970; Cronbach, 1968; Gakhar, 1973 and Gupta, 1979).
Creativity as a process has been considered by Spearman (1930), Kubie (1958), Bartlet (1958), Vinacke (1960), Ghiselin (1963), Yamamoto (1964), Torrance (1965), Medmick (1967), Rogar (1976), Kant (1976), Brown (1977), and Gordon (1982). Wallas (1926) suggests that the creative process can be divided into four stages: preparation, incubation, illumination and verification. According to Taylor (1964), the Wallas steps towards creative accomplishment are valid, but it is also necessary to recognize the hierarchical levels of creativity which from the lowest to the highest are: expressive creativity, technical creativity, inventive creativity, innovative creativity and emergentive creativity.

According to Torrance (1962) creative process consists of identifying problems, developing hypotheses as to the causes of problems, finding out new solutions, application of those solutions which involve improvement of product and usual uses and finally communicating the results. According to him verbal creativity can be measured in terms of fluency, flexibility and originality.

Creative products essentially involve element of uniqueness or novelty has been viewed in tangible products, but certain others (Stewart, 1950, Guilford, 1964) hold that it can also be present in the intangible products. Thurstone (1952) too argues that it does not make any difference whether the society regards an idea as novel or not.
Thus environmental factors contribute to creative process and product. Torrance (1965), Hassan and Butcher (1966), Synder (1967), Goyal (1973), Roger (1976) opine that conditions of psychological freedom should be set up so as to maximize the likelihood of emergence of constructive creativity. Roe (1952), Nuss (1962), Smith (1966), Hudson (1966), Torrance (1973), Vohra (1975), Vijaylakshmi (1980) state that socio-economic status may act as a inhibiting/facilitating factor of creativity.

According to Skinner (1963) creative thinking means that, the prediction and/or inference for an individual are now, original, ingenious, unusual. The creative thinker is one who explores new areas and makes new observations, new predictions, new inferences.

In spite of these broadly discriminating categories of definitions, it is not always possible to include a particular definition within one particular category. This is mainly on account of overlapping of one category of definitions with the others. Further, creative process without having reference to person, press and product is equally ambiguous. Torrance (1965), while accepting the 'process' definition of creativity, has rightly raised the question: what kind of person one must be in order to engage most successfully in the process and what kind of product results from the process?
Thus at least five components of creativity have been stressed - the act, the object, the process, the person and the environment.

Busse and Mansfield (1981) review of major theories give the description of creative process. Psychoanalytic theories of Kris (1952) and Kubie (1958) emphasize the importance of pre-conscious process. These processes are believed to occur when the ego, with its emphasis on logical, rational thought, temporarily loosens its control of the thinking processes so that an unorganized, drive-oriented type of thinking can occur. Gestalt psychologists (e.g. Kohler, 1947) employ the term "productive thinking" and "problem solving" to refer to what others might call creative thinking. The structural features of problem itself set up stresses and strains in the thinker. By following up these stresses and strains, the thinker is led to a re-structuring of the problem. Successive restructuring occur until a solution emerges.

Associationist theories involve the common assumption that creativity results from novel or unusual associations (Koestlar 1964, Gruber 1974). Medmick (1967) defined the creative process as "the forming of associative elements into new combinations which either meet specified requirements or are in some way useful." The degree of creativity depends on the relative remoteness of the elements used to form the new combination. When asked to respond to a stimulus word, highly creative people are likely to give remote
or uncommon responses; whereas less creative people tend to give only common stereotyped responses. Koestler (1964) developed a "bisociations" theory of creativity. In bisociation two independent matrices of ideas come into contact, but this occurs only subconsciously through a regression to the pre-conscious thinking processes stressed by psychoanalytic theorists.

A number of theories have been considered composite by Busse and Mansfield (1981) because they combine principles from psychoanalytic, Gestalt and associationist theories. Hadamard (1945) theory combines psychoanalytic as well as associationist ideas. He proposes the same steps of the creative process as proposed by Wallas earlier: preparation, incubation, illumination and verification.

The fundamentally different approaches to the study of creativity have been given by Mansfield and Busse (1982). First, creativity is considered in terms of test performance. The divergent thinking tests developed by Torrance (1966), Guilford (1967), Guilford and Hoepfner (1966) and other to measure divergent thinking abilities have often been used to measure of creativity. Divergent thinking tests use problems that allow many possible solutions. Researchers who use tests to measure creativity assume that the abilities being tested are essential to treat life creativity and persons with high test scores have high potential for creative accomplishment. Secondly, real life creativity
may be measured directly in terms of products such as poems, symphonies, book, inventions and scientific theories. Jackson and Messick (1967) have proposed that creative products are characterized by four features: novelty, value, transformation and condensation. A creative product must be novel, possess some value or appropriateness and characterized by properties of transformation and condensation.

In the present study creativity has been operationally defined as "the process of sending gaps or disturbing, missing elements: forming ideas or hypotheses concerning theory testing these hypotheses; and communicating the results, possibly modifying and retesting the hypotheses." (Torrance, 1966). Its measure is the total of scores on fluency, flexibility and originality as measured by Torrance's Test of Creative thinking (TTCT), Verbal Form A(1966). Fluency is the ability to call up relevant ideas where the quantity, and not the quality, is emphasized. It is the total number of relevant responses i.e. the total number of responses given by the subject minus the number of duplicate and irrelevant responses. Flexibility is the ability to produce diversity of idea and with a number of shifts. Originality is the statistical infrequency of responses or the extent to which the responses deviate from the obvious and the common.

2.7 Urban/Rural Differences:

The mean distinction between rural and urban setting
may be that in rural setting we get primary products, e.g. sugar cane, wheat etc., whereas in urban setting we get secondary products, i.e. sugar, oil, etc.

**Urban**

Urban denotes a distinct quality of human community, a special mode of existence or way of life which is characteristic of the city. Thus, the students who study in urban schools and colleges are considered to be urban students.

**Rural**

A society or community may be classified as rural which has less population, less social differentiation, slower rates of social change, agriculture as a major occupation. The students who are studying in rural schools and colleges are considered to be belonging to rural group.

The role of rural and urban environment in accelerating students academic achievement is of paramount importance. Good environment accelerates activities and leads to better outcome and also potentials of students find full play. What has generally been found is that rural children, rural parents and rural communities have low level of educational aspirations and expectations. Rural children have been shown to be more shy, anxious and introverted in
personality than their urban counterparts.

In the present study urban students have been defined as those students who are living and studying in towns or cities, whereas rural students are those students who have rural background and are also studying in those institutions which are established in rural areas.